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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/646,765	08/25/2003	Jung-Chien Chang	33144-192203	1279
26694	7590	05/10/2005	EXAMINER	
VENABLE LLP			MAY, ROBERT J	
P.O. BOX 34385			ART UNIT	
WASHINGTON, DC 20435-9998			PAPER NUMBER	

2875

DATE MAILED: 05/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/646,765

Applicant(s)

CHANG, JUNG-CHIEN

Examiner

Robert May

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☒ Claim(s) 7 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08/25/05 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

The disclosure is objected to because of the following informalities: the term RTV silicon is ambiguous as the term may mean a RTV silicone or a silicone rubber material. For the purpose of examination, the examiner has interpreted the term to mean a silicone rubber material. The examiner requests the applicant to change the term accordingly as well as in the corresponding claims if the applicant has meant for the term to be construed in a different way. The applicant is cautioned not to submit any new matter to the application in order to define the term.

***Claim Objections***

Claim 7 is objected to because of the following informalities: Claim 7 is separated from the claim, which it depends on by a claim that does not also depend from the claim. Appropriate correction is required.

A series of singular dependent claims is permissible in which a dependent claim refers to a preceding claim which, in turn, refers to another preceding claim.

A claim which depends from a dependent claim should not be separated by any claim, which does not also depend from said dependent claim. It should be kept in mind that a dependent claim may refer to any preceding independent claim. In general, applicant's sequence will not be changed. See MPEP § 608.01(n).

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this

Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1-2 are rejected under 35 U.S.C. 102(b) as being anticipated by Roney (US 5,528,474).

Referring to Claim 1, Roney discloses in Fig. 2 an LED array which emits light from one side, in which a multitude of LED's (12) reside between sections of a thermally conductive layer (14). The LED array is encapsulated or covered by a lens (16), which inherently cover and protect the LED's. The thermally conductive layer is disclosed as being in direct contact with the LED array, a copper layer, and metallic housing which transfers the heat away from the LED's through the heat sink to the outside environment during operation (Col. 3, Lines 33-52). Furthermore the side opposite from the LED array is adapted to or has terminals for electrically powering the LED Lamp.

Referring to Claim 2, Roney discloses in Fig. 2 the LED's (12) as being densely arranged within the sections of the thermally conductive layer and on a conductive layer (26).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating

obviousness or nonobviousness.

Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roney in view of Prasher (US Pat. 6,639,799).

Referring to Claims 3 and 4, Roney discloses An LED Array, which is discussed above as having all the claimed features except for the heat sink being a sealed chamber with a vaporable liquid held inside the chamber to absorb heat emitted by the LED's. Furthermore, Roney does not disclose multiple fins attached to the outer surface area of the heat sink. However, attention is directed to the Prasher reference which does disclose a heat sink comprising a chamber filled with vaporable liquid which absorbs heat generated by small and thin high performance electronic devices (Col 6, Line 35-36). Furthermore,

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Prasher discloses the heat sink as comprising a plurality of fins, which are bonded to a wall of the chamber, which forms a heat sink (Col. 4, Lines 50-54). It would have been obvious to one having ordinary skill in the art to use the heat sink and fins of Prasher for the LED array of Roney. The teaching suggestion and motivation to combine Prasher with Roney which is that the integrated vapor chamber heat sink with fins as disclosed by Prasher is for use in lightweight and compact electronic devices such as microprocessors (Col 1, Lines 16-17) and has less thermal resistance than prior art thermal designs by eliminating a layer of thermal interface material (Col 6, Lines 13-15).

Claims 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roney in view of Prasher as applied Claim 3 and 4 above and further in view of Moore (PG Pub. 2003/0043590).

With regard to Claims 5-6, as mentioned above Roney and Prasher disclose all of the elements in Claims 1-3, however does not disclose an RTV silicone as a non-electrically yet thermally conductive layer. However, Moore discloses using a silicone rubber (Pg 3, Para [0051]). Therefore, it would have been obvious to one of ordinary skill in the art to use the silicone rubber of Moore in the heat sink of Prasher for the LED array of Roney since silicone rubber is disclosed as being flexible and able to withstand severe temperature changes (Col 2, Lines 67-68 to Col 3, Lines 1-2).

With regard to Claims 7-8, Moore further discloses that adding Ceramic or other mineral powder will enhance the thermal conductivity of silicone (Col 3, Lines 3-5). Therefore it would have been suggested, motivating and obvious to

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one of ordinary skill in the art to combine Roney, Prasher and Moore as recited in Claims 7-8.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Matsui (PG Pub. 2003/0072153 A1) discloses an LED module with multiple LED chips positioned on a heat sink substrate with a protective cover. Reed (US Pat 3,593,070) discloses a sub-mount for a semiconductor assembly, which includes a heat sink and also discloses a multiple -unit array of radiant diodes. Alexanderson (PG Pub. 2003/0048641 A1) Discloses an LED system that comprises a plurality of LEDs mounted on a heat sink bracket with thermally conductive layer with a protective lens, which covers the LED's. Shih (PG Pub. 2004/0052077 A1) discloses an LED lighting module with a heat sink with a thermal-only conductive layer. Koike (US Pat 6,345,903) discloses a multitude of LED crystals positioned on a conductive layer encapsulated by an epoxy resin. Walser (PG Pub. 2003/0043590) discloses using RTV silicon as a heat sink compound in a vehicle lamp assembly. Mitikoshi, a Japanese patent (JP 409296114A) discloses adding a ceramic powder to enhance the thermal conductivity of silicone rubber.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert May whose telephone number is (571) 272-5919. The examiner can normally be reached between 9 am- 5:30pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea can be reached on (571) 272-2378. The fax number for the organization where this application or proceeding is assigned is (703) 872-9306 for all communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval PAIR system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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